

October 12, 2004

Mr. Mark E. Warner, Site Vice President
c/o James M. Peschel
Seabrook Station
P.O. Box 300
Seabrook, NH 03874

SUBJECT: SEABROOK STATION, UNIT NO. 1- AMERICAN SOCIETY OF MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE - RELIEF FOR CLASS 3 SERVICE WATER PIPING SYSTEM (TAC NO. MC1817)

Dear Mr. Warner:

By letter dated January 14, 2004, FPL Energy Seabrook, LLC (the licensee) submitted a proposed alternative to the requirements of IWA-4000 of American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (ASME Code), Section XI. The licensee requested that the Nuclear Regulatory Commission (NRC) approve ASME Code Case N-661, "Alternative Requirements for Wall Thickness Restoration of Class 2 and 3 Carbon Steel Piping for Raw Water Service" for use at the Seabrook Station, Unit No. 1 (Seabrook). The request was made pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i) for the current 10-year inservice inspection (ISI) interval.

ASME Code, Section XI, IWA-4000 provides rules and requirements for the repair of pressure retaining components and their supports by welding, brazing, or metal removal. Code Case N-661 allows the application of a weld metal overlay on the exterior of the piping system to restore the wall thickness of the component.

Based on the information provided in the licensee's submittal, the NRC staff concludes that the licensee has provided an acceptable alternative to the requirements of IWA-4000 of ASME Code, Section XI subject to the following three conditions that must be met when using Code Case N-661. These conditions are: (a) if the root cause of the degradation has not been determined, the repair is only acceptable for one cycle, (b) weld overlay repair of an area can only be performed once in the same location, and (c) when through-wall repairs are made by welding on surfaces that are wet or exposed to water, the weld overlay repair is only acceptable until the next refueling outage. The NRC staff concludes that the proposed alternative, as supplemented by the three conditions listed above provides reasonable assurance of structural integrity and safety. Therefore, the proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for Seabrook for the second 10-year ISI interval, or until Code Case N-661 is approved for general use by reference in Regulatory Guide 1.147 "Inservice Inspection Code Case Acceptability -- ASME Section XI, Division 1." The NRC staff's safety evaluation is enclosed.

M. Warner

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If you need clarification of this approval, please contact the project manager, Mr. Scott P. Wall, at (301) 415-2855.

Sincerely,

/RA/

Daniel S. Collins, Acting Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-443

Enclosure: As stated

cc w/encl: See next page

M. Warner

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST TO USE CODE CASE N-661

SEABROOK STATION, UNIT NO. 1

FPL ENERGY SEABROOK, LLC

DOCKET NO. 50-443

1.0 INTRODUCTION

By letter dated January 14, 2004 (ADAMS Accession No. ML040210539), FPL Energy Seabrook, LLC (FPLE or the licensee) requested that the Nuclear Regulatory Commission (NRC or the Commission) approve an alternative to the requirements of IWA-4000 of American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel Code (ASME Code), Section XI. Specifically, the licensee requested that the NRC approve ASME Code Case N-661, "Alternative Requirements for Wall Thickness Restoration of Class 2 and 3 Carbon Steel Piping for Raw Water Service" for use at the Seabrook Station, Unit No. 1 (Seabrook). The request was made pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(a)(3)(i). The relief is needed to address replacement or internal weld repair of wall thinning conditions resulting from various wall thinning degradation mechanisms such as erosion, corrosion, cavitation, and pitting in Class 3 carbon steel raw water piping systems. Code Case N-661 provides an alternative to allow the licensee to restore wall thickness externally by means of a weld-deposited carbon or low-alloy steel reinforcement on the outside surface of the piping.

2.0 REGULATORY EVALUATION

Section 50.55a(g) specifies that inservice inspection (ISI) of nuclear power plant components shall be performed in accordance with the requirements of the ASME Code, Section XI, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) will meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in ASME Code, Section XI, to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system

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pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code, incorporated by reference in 10 CFR 50.55a(b), twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b), subject to the limitations and modifications listed therein and subject to Commission approval. The ISI Code of record for Seabrook, second 10-year ISI interval, is the 1995 Edition of ASME Code, Section XI with the 1996 Addenda

3.0 TECHNICAL EVALUATION

The licensee's regulatory and technical analyses in support of its requests for relief is described in the licensee's submittal dated January 14, 2004. The licensee submitted a relief request to use ASME Code Case N-661 at Seabrook as an alternative to ASME Section XI, IWA-4000. A description of the relief request and the NRC staff evaluation follows.

3.1 Systems/Components for Which Relief is Requested

ASME Class 3 carbon steel service water piping system.

3.2 ASME Section XI Code Requirements (as stated by the licensee)

Article IWA-4000 in the 1995 edition with 1996 addenda of Section XI of the ASME Boiler and Pressure Vessel Code provides the rules and requirements for the repair of pressure retaining components and their supports, including appurtenances, subassemblies, parts of a component, core support structures, metal containments and their integral attachments, and metallic portions of Class CC containments and their integral attachments, by welding, brazing, or metal removal. Article IWA-4000 also provides the rules and requirements for the specification and construction of items to be used for replacement and installation of replacement items.

3.3 Basis for the Relief Request (as stated by the licensee)

Relief is being requested from the replacement and internal weld repair rules and requirements provided in ASME Section XI, Article IWA-4000 as applicable to ASME Class 3, carbon steel, Service Water system piping that has experienced internal wall thinning from localized erosion, corrosion, cavitation, or pitting. Relief is being requested from the rules and requirements of ASME Section XI, Article IWA-4000 for replacements and internal weld repairs to ASME Class 3, carbon steel, Service Water piping pursuant to 10CFR50.55a(a)(3)(i) on the basis that the proposed alternative will provide an acceptable level of quality and safety.

The design function of the Service Water system is to transfer heat loads from various sources in both the primary and secondary portions of the plant to the ultimate heat sink. The ultimate heat sink for all operating and accident loads is normally the Atlantic Ocean. Four (4) Service Water pumps located in the

Service Water pump house normally supply the Service Water system heat loads. The design conditions for the Service Water system piping, valves, and pumps are 150 psig and 200°F. The piping in the safety-related portion of the Service Water system was designed, installed, and ASME Code stamped as a Class 3 component in accordance with ASME Section III, Subsection ND of the ASME Boiler & Pressure Vessel Code. The piping in the non safety-related portion of the Service Water piping system was designed and installed in accordance with the ANSI B31.1 Power Piping Code. There is no ASME Code Class 2 Service Water system piping in the plant.

In the unlikely event that the Atlantic Ocean seawater flow to the Service Water pumps in the Service Water pump house is restricted, a mechanical draft evaporative cooling tower is available to dissipate shutdown and accident heat loads. The two (2) Service Water Cooling Tower pumps are used to circulate water through the required Service Water system loads and the Service Water Cooling Tower.

3.4 Alternative Requirements (as stated by the licensee)

As an alternative to ASME Section XI, Article IWA-4000 replacement and internal weld repair rules and requirements, FPL - Energy Seabrook, LLC proposes to implement ASME Section XI Code Case N-661 titled "Alternative Requirements for Wall Thickness Restoration of Classes 2 and 3 Carbon Steel Piping for Raw Water Service". This ASME Code Case was recently approved by the ASME Board Nuclear Codes & Standards (BNC&S) and has subsequently been issued in Supplement 5 to the 2001 edition of the ASME Boiler & Pressure Vessel Code. This Code Case allows wall thickness restoration externally by means of a weld-deposited carbon steel or low-alloy steel reinforcement on the outside of the piping in accordance with the provisions of the Code Case.

In addition to the ASME Code Case N-661 requirements, all external weld repairs to Service Water system piping performed in accordance with Code Case N-661 will be performed by FPL Energy Seabrook, LLC or its Agent in accordance with the Operational Quality Assurance Program and work control program. Also, when FPL Energy Seabrook, LLC implements ASME Code Case N-661, the following three conditions will be met. These conditions are; (a) a root cause of the degradation will be determined, (b) the weld overlay repair of the area will only be performed once in the same location, (c) when through-wall repairs are made by welding on surfaces that are wet or exposed to water, the weld overlay repair will only be acceptable until the next refueling outage.

3.5 Duration of Proposed Alternative (as stated by the licensee)

FPL Energy Seabrook LLC proposes the use of Code Case N-661 pursuant to 10 CFR 50.55a(a)(3)(i) for Seabrook Station, Unit 1 until approved for general use by reference in Regulatory Guide 1. 147 "Inservice Inspection Code Case Acceptability - ASME Section XI Division 1."

3.6 Staff Evaluation

By letter dated January 14, 2004, the licensee requested that the NRC approve an alternative to the requirements of IWA-4000 of ASME Code, Section XI. Specifically, the licensee requested to use the requirements of ASME Code Case N-661 to perform temporary weld repair of degraded ASME Class 3, carbon steel, service water piping using weld overlay. The request was made pursuant to 10 CFR 50.55a(a)(3)(i). Seabrook is currently in the second 10-year ISI interval and is committed to the 1995 Edition of ASME Code, Section XI with the 1996 Addenda.

ASME Code, Section XI, IWA-4000 requires that repairs be performed in accordance with the Owner's Design Specification and the repairs meet the requirements of the original Construction Code of the component or system. The licensee is proposing to use the provisions of Code Case N-661 to perform an alternative repair of degraded components which involves the application of weld metal overlay on the exterior of the piping system to restore the wall thickness of the component.

The NRC staff finds the licensee's reasoning in support of its request for relief acceptable. This finding is based on the fact that the staff has reviewed Code Case N-661 for inclusion in its Regulatory Guide (RG) 1.147. In addition, the licensee has committed to follow three conditions established by the staff when using the provisions of Code Case N-661 to repair raw water system components. These conditions are: (a) if the root cause of the degradation has not been determined, the repair is only acceptable for one cycle, (b) weld overlay repair of an area can only be performed once in the same location and (c) when through-wall repairs are made by welding on surfaces that are wet or exposed to water, the weld overlay repair is only acceptable until the next refueling outage.

The NRC staff established these three conditions based on the following considerations: (a) if the root cause of the degradation has not been determined, a suitable reinspection frequency cannot be established, (b) weld overlay repair of an area can only be performed once to ensure that ineffective repairs are not being repeatedly implemented in the same location, and (c) performing through-wall weld repairs on surfaces that are wet or exposed to water would produce welds that include weld defects such as porosity, lack of fusion, and cracks. It is highly unlikely that a weld can be made on an open root joint with water present on the backside of the weld without having several weld defects. These types of weld defects can, and many times do, lead to premature failure of a weld joint.

4.0 CONCLUSION

Based on the information provided in the licensee's submittal, the NRC staff concludes that the licensee has provided an acceptable alternative to the requirements of IWA-4000 of ASME Code, Section XI subject to the following three conditions which must be met when using Code Case N-661. These conditions are: (a) if the root cause of the degradation has not been determined, the repair is only acceptable of one cycle of operation, (b) weld overlay repair of an area can only be performed once in the same location and (c) when through-wall repairs are made by welding on surfaces that are wet or exposed to water, the weld overlay repair is only acceptable until the next refueling outage. The staff concludes that the proposed alternative, as supplemented by the three conditions listed above provides an acceptable level of quality and safety, and provides reasonable assurance of structural integrity and safety. Therefore, the

proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the Seabrook Station, Unit 1 for the current 10-year ISI interval, or until Code Case N-661 is approved for general use by reference in RG 1.147. After that time, if the licensee wishes to continue to use Code Case N-661, the licensee must follow the conditions, if any, specified in the RG. All other ASME Code, Section XI, requirements for which relief was not specifically requested and authorized herein by the NRC staff remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: G. Georgiev

Date: October 12, 2004

Seabrook Station, Unit No. 1

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